IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of:		Conf. No:	7809
Claire A. CAJACOB *et al.*		Art Unit:	1637
Appln. No.:	09/233,218	Examiner:	Young J. KIM
Filed:	January 20, 1999	Atty. Docket:	16517.231/38-21(15090)B
Title:	**Nucleic Acid Molecules and Other Molecules Associated with the Tetrapyrrole Pathway**		

APPELLANT'S BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attn: Mail Stop Appeal Brief-Patents

Sir:

This is an Appeal from the final rejection of all claims pending in the above-described patent application. A Notice of Appeal was filed on April 28, 2003. Authorization to charge the official fees for this filing is given in the accompanying transmittal letter. *This Brief is submitted in triplicate.*

1. Real Party in Interest

The real party in interest is Monsanto Company, a Delaware corporation with offices at 800 North Lindbergh Boulevard, St. Louis, Missouri 63167.

2. Related Appeals and Interferences

The Applicants are unaware of any Appeals or Interferences related to this Appeal.

3. Status of Claims

Claims 1 and 10-23 are pending. Claims 1 and 10-23 stand finally rejected under 35 U.S.C. § 112, first paragraph. Applicants appeal all of the rejections to claims 1 and 10-23.

4. Status of Amendments

Subsequent to the Final Office Action mailed January 27, 2003 (Paper No. 27) ("Final Action"), Applicants filed, on April 7, 2003, an Amendment after Final Rejection amending claim 1. This amendment was entered per the Advisory Action mailed April 21, 2003.

5. Summary of Invention

The invention is directed to nucleic acid molecules comprising a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605 and complements thereof. Specification at page 25, lines 5-9 and page 61, lines 1-15. The invention is also directed to nucleic acid molecules consisting of a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605. Specification at page 25, lines 5-9 and page 61, lines 1-3.

6. Issues

The issues in this Appeal are:

(a) whether claims 1 and 10-23 are unpatentable under 35 U.S.C. § 112, first paragraph, for alleged lack of enablement because undue experimentation would supposedly be required to use the claimed nucleic acid molecules; and

(b) whether claims 1 and 10-22 are unpatentable under 35 U.S.C. § 112 first paragraph for alleged insufficiency of written description.

7. Claims

Patentability of claims 1 and 10-23 is addressed together in Sections 9.A through 9.B below. The separate patentability of claims 1 and 10-22 is addressed in Section 9.C below. A copy of the claims on appeal is attached hereto as Appendix A.

8. Preliminary Remarks

Applicants thank the Examiner for acknowledging the amendment to the specification to correct obvious typographical errors. Applicants disagree, however, with the Examiner's remark that "the SEQ ID Numbers which were amended to be excluded are drawn to 'putative' soybean or maize glutamyl t-RNA reductase and protochlorophyllide reductase enzymes." Final Action at page 2. The Examiner has cited no authority for this remark and Applicants' amendment to the specification is clear on its face.

9. Argument

A. Summary of Appellant's Position

Applicants have asserted that the claimed nucleic acid molecules actually work for the utilities disclosed and described in the specification, and so the enablement rejection must be reversed. Applicants have asserted that one skilled in the art is able to use the claimed nucleic acid molecules for at least two disclosed utilities, namely use to identify the presence or absence of a polymorphism and use as a hybridization probe for expression profiling. *See, e.g.*, specification at page 52, line 3 through page 53, line 5; page 83 line 9 through page 91, line 3; and page 91, lines 4 to 13. The law clearly establishes that the enablement requirement is satisfied if at least one mode of making and using the invention is enabled. Because Applicants have asserted that the claimed nucleic acid molecules work for the disclosed utilities, the enablement requirement of 35 U.S.C. § 112 has been met.

Furthermore, Applicants have provided an adequate description of the claimed nucleic acid molecules that demonstrates Applicants' possession of the claimed invention. Each genus of claimed nucleic acid molecules, *i.e.*, those comprising the nucleic acid sequences of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605, for example, have been described by the recitation of common structural features – the nucleotide sequences of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605, respectively – which distinguishes molecules in

the genus from molecules not in the claimed genus. Because the specification demonstrates that Applicants had possession of (and have provided an adequate description of) the claimed genera of nucleic acid molecules, the specification satisfies the written description requirement of 35 U.S.C. § 112.

B. The Specification is Enabling for the Scope of the Claimed Nucleic Acid Molecules

Claims 1, 2, and 10-23 were erroneously rejected as not being enabled by the specification. The Final Action asserts the claims "contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention." Final Action pages 2-3.

Applicants respectfully point out that claim 2 was cancelled without prejudice to or disclaimer of the underlying subject matter in the previous response. Therefore, Applicants will proceed as if the rejection is directed to claims 1 and 10-23.

In discussing Applicant's previous response, the Examiner states that 210 USPQ 307 is the cite to *Warnaco Inc v. Adventure Knits, Inc.*, and not *Ex Parte Lemak*, as cited by Applicants. Applicants respectfully point out that Applicants correctly cited 210 USPQ 306, 307, which is *Ex Parte Lemak*, and not 210 USPQ 307, which is *Warnaco Inc. v. Adventure Knits, Inc.* in the previous response.

The Examiner states that the enablement rejection was solely based on the Applicants' asserted utility of the claimed nucleic acids encoding glutamyl-tRNA reductase enzyme and states that "the enablement argument will be drawn to whether or not the claimed nucleic acids do in fact encode a functional glutamyl-tRNA reductase." Final Action at page 4. Applicants assert that the Examiner has met the evidentiary burden to impose an enablement rejection, nor has the Examiner presented evidence to suggest that one skilled in the art would doubt the claimed nucleic acid molecules would encode a maize glutamyl-tRNA reductase enzyme or

fragment thereof based on Applicants' disclosure. However, to facilitate prosecution, Applicants have amended claim 1 in the Amendment After Final Rejection filed on April 7, 2003. Furthermore, the Examiner notes that Applicants' amendment effectively made the claims drawn to a polynucleotide comprising a set of SEQ ID Numbers and their complements. Advisory Action at page 2. In light of the amendment, Applicants believe the rejection of claims 1, 10, and 22 under 35 U.S.C. § 112, first paragraph, has been rendered moot.

In addition, claims 11-21 and 23 do not include the recitation of a nucleic acid molecule that encodes a maize tetrapyrrole pathway enzyme or fragment thereof and therefore should not have been rejected in accordance with the Examiner's statement that "the enablement argument will be drawn to whether or not the claimed nucleic acids do in fact encode a functional glutamyl-tRNA reductase." Office Action at page 4. In light of this assertion by the Examiner, it is unclear to Applicants why the Examiner maintains the enablement rejection for these claims.

The Examiner cites no support for the proposition that the full scope of the claims would require undue experimentation by one of ordinary skill in the art to make or use the claimed invention for the uses described in Applicants' disclosure. In particular, Applicants have previously stated that the claimed nucleic acid molecules are useful as markers and probes (*see, e.g.,* specification at page 68, line 17 through page 69, line 9); to identify and obtain nucleic acid homologues (*see, e.g.,* specification at page 80, line 8 through page 81, line 9); to identify the presence or absence of a polymorphism (*see, e.g.,* specification at page 83, line 9 through page 91, line 3); to identify the concentration, presence or expression pattern of mRNA in a sample (*see, e.g.,* specification at page 96, line 14 through page 97, line 23); use to transform plants and other organisms (*see, e.g.,* specification at page 108, line 6 thorough page 118, line 9); and use to overexpress or suppress a desired protein (*see, e.g.,* specification at page 126, line 17 through page 129, line 8).

In addition, the claimed nucleic acid molecules are particularly useful, for example, to isolate a promoter active in the tetrapyrrole pathway of a maize or soybean plant. *See, e.g.*, specification at page 168, line 17 through page 238, line 9 (Example 1), and Table A. Furthermore, because each of the claimed nucleic acid molecules has been asserted in the specification to encode a maize glutamyl-tRNA reductase ("GluTR") or fragment thereof, use of the claimed nucleic acid molecules have particular relevance, for example, to the identification of polymorphisms, promoters, and patterns of expression of this enzyme. The Examiner has cited no support for the proposition that the claimed nucleic acid molecules are not enabled for these uses.

It is well established patent jurisprudence that Applicants need not teach "conventional and well-known genetic engineering techniques" (*see, for example, Ajinomoto Co. v. Archer-Daniels-Midland Co.*, 228 F.3d 1338, 1345, 56 U.S.P.Q.2d 1332, 1337 (Fed. Cir. 2000)), which would include the use of the claimed nucleic acid sequences with other nucleic acid sequences. Applicants submit the Examiner has not met the required burden to impose an enablement rejection. Applicants further assert that the use of the transitional phrase "comprising" or "having", which leaves the claims "open for the inclusion of unspecified ingredients even in major amounts" (*Ex parte Davis*, 80 U.S.P.Q. 448, 450 (B.P.A.I. 1948). *Accord PPG Indus. v. Guardian Indus.*, 156 F.3d 1351, 1354, 48 U.S.P.Q.2d 1351, 1353-54 (Fed. Cir. 1998); *Moleculon Research Corp. v. CBS*, 793 F.2d 1261, 1271, 229 U.S.P.Q. 805, 812 (Fed. Cir. 1986)) is well established in patent jurisprudence.

Additionally, Applicants have previously responded to the Examiner's analysis of the Wands factors set forth in the Office Action of July 16, 2001 at pages 4-7 and in Appellant's Brief filed on May 15, 2002. Applicants maintain that a reasonable analysis of the *In re Wands* criteria supports Applicants position that no undue experimentation would be required to make

and use the claimed invention. *See In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1998).

The first *Wands* criterion is the quantity of experimentation necessary. The "make-and-test" quantum of experimentation is reduced by the extensive knowledge, *e.g.*, of conservative nucleotide substitutions, identification of an active site, and radiometric synthase assay conditions, to which a person of ordinary skill in the art has access. Performing routine and well-known steps, such as sequence alignment protocols, molecular weight determination, and antibody hybridization assays, cannot create undue experimentation even if it is laborious. *See In re Angstadt*, 537 F.2d 498, 504, 190 USPQ 214, 218-219 (C.C.P.A. 1976).

The second and third *Wands* criteria relate to the amount of direction or guidance given, and the presence or absence of working examples. Again, the specification provides evidence of sequence identity, discusses the use of the claimed SEQ ID NOs to isolate additional sequences within a genome, and describes how to isolate and generate libraries from the nucleic acid molecules. *See, e.g.,* page 68 lines 17 *et seq.* and Example 1, page 168 *et seq.* Based on such disclosure, one of ordinary skill in the art would be enabled to make and use the invention commensurate in scope with the claims.

The fourth, fifth, and sixth *Wands* criteria focuses on the nature of the invention, the state of the art, and the relative skill in the art. The present invention relates to nucleic acid molecules comprising nucleic acid sequences, and the specification further describes amino acid sequences derived therefrom, and constructs and methods related thereto. *See, e.g.*, specification at page 72, line 12 through page 76, line 12 (describing polypeptide molecules and homologues), and page 108, line 3 through page 130, line 4 (describing use of the claimed nucleic acid molecules in methods of transforming plants). Practitioners in this art are guided by considerable knowledge and resources on the conditions and approaches that can be utilized to identify, confirm, and introduce into other hosts, nucleic acid and amino acid sequences.

The seventh criterion considers the predictability of the art. Applicants respectfully assert, as discussed *supra*, that the specification discloses, for example, sufficient guidance to render the results of substitutions, additions, and deletions within the claimed SEQ ID NOs predictable. *See, e.g.*, specification at page 64, line 4 through page 65; at page 103, line 16 through page 105, line 7; and the sequence listing.

The eighth criterion focuses on the breadth of the claims. Enablement is satisfied when the disclosure "adequately guide[s] the art worker to determine, without undue experimentation, which species among all those encompassed by the claimed genus possess the disclosed utility". *See In re Vaeck*, 947 F.2d 488, 496, 20 USPQ2d 1438, 1445 (Fed. Cir. 1991). In the present case, one of skill in the art is specifically guided by the disclosure to look to, *e.g.*, sequence identity data in making that determination.

The Examiner has presented no evidence supporting the allegation that one of ordinary skill in the art would not be able to make or use the claims nucleic acid molecules in light of Applicants' disclosure. Furthermore, the analysis of the Wands factors, discussed *supra*, conclusively establishes that one of ordinary skill in the art would be able to make and use the claimed invention based on the disclosure in the specification. Accordingly, for at least these reasons, the enablement rejection under 35 USC § 112, first paragraph, is improper and must be reversed.

C. The Specification Provides an Adequate Written Description of the Claimed Invention

Despite the Examiner's admission that the sequences of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605 meet the written description provision of 35 U.S.C. § 112, first paragraph (Final Action at page 6), the adequacy of the written description has been challenged for claims 1 and 10-22 by the Examiner because the claimed subject matter was allegedly "not described in the specification in such a way as to reasonably convey to one skilled

in the relevant art that the inventor(s). . . had possession of the claimed invention." Final Action at page 6. The bases for the Examiner's challenge are apparently that (1) one of skill in the art would allegedly conclude that Applicants were not in possession of the claimed nucleic acid molecules, and (2) there is allegedly an insufficient written description to support the genus encompassed by the claim. Final Action at pages 6-7. These are not proper bases for a written description rejection of a "comprising" claim. If they were, every "comprising" claim ever written would be invalid for failing to describe every nuance of the claimed invention. Furthermore, the specification demonstrates to one skilled in the art that Applicants were in possession of the claimed genera of nucleic acid molecules.

(1) The Specification Reflects Applicants' Possession of the Claimed Invention

The purpose of the written description requirement is to ensure that the inventors had possession of the claimed subject matter, *i.e.*, to ensure that the inventors actually invented what is claimed. *Gentry Gallery Inc. v. Berkline Corp.*, 134 F.3d 1473, 1479, 45 U.S.P.Q.2d 1498, 1503 (Fed. Cir. 1998); *Lockwood v. American Airlines*, 107 F.3d 1565, 1572, 41 U.S.P.Q.2d 1961, 1966 (Fed. Cir. 1997); *In re Alton*, 76 F.3d 1168, 1172, 37 U.S.P.Q.2d 1578, 1581 (Fed. Cir. 1996). If a person of ordinary skill in the art would, after reading the specification, understand that the inventors had possession of the claimed invention, even if every nuance of the invention was not expressly described, then the written description requirement has been met. *In re Alton*, 76 F.3d at 1175, 37 U.S.P.Q.2d at 1584. After reading the present specification, a person of ordinary skill in the art would understand that Applicants had possession of nucleic acid molecules comprising SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605, and their complements, and therefore, the claimed invention.

Applicants have provided the nucleic acid sequences required by the claims, *i.e.*, SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605, as well as, for example, vectors comprising the nucleic acid sequence (*see, e.g.,* specification at page 109 line 4 *et seq.*),

hybridization conditions which may be used with the nucleic acid molecules of the present invention (*see, e.g.,* specification at page 59 line 8 *et seq.*), and binary artificial chromosomes (BIBACs) and other systems that may be used to introduce the claimed nucleic acid molecules into a host cell (*see, e.g.,* specification at page 117 line 11 *et seq.*), and have thus established possession of the claimed invention. The fact that the claims at issue are intended to cover molecules that include the recited sequences joined with additional sequences, or that hybridize under specific conditions to the recited sequences, does not mean that Applicants were any less in possession of the claimed nucleic acid molecules.[1] It is well-established that use of the transitional term "comprising" leaves the claims "open for the inclusion of unspecified ingredients even in major amounts." *Ex parte Davis*, 80 U.S.P.Q. 448, 450 (B.P.A.I. 1948). *Accord PPG Indus. v. Guardian Indus.*, 156 F.3d 1351, 1354, 48 U.S.P.Q.2d 1351, 1353-54 (Fed. Cir. 1998); *Moleculon Research Corp. v. CBS*, 793 F.2d 1261, 1271, 229 U.S.P.Q. 805, 812 (Fed. Cir. 1986).

Applicants have provided in the present disclosure not only the nucleotide sequences required by the claims (*i.e.*, SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605), but also several variations including and directed to the claimed nucleic acid molecules. For example, the present specification describes vectors comprising the claimed nucleic acid molecules (specification at page 109 line 4 *et seq.*), and describes how to make the nucleotide sequences and the libraries from which they were originally purified. *See, e.g.,* Examples page 168 *et seq.*). Furthermore, the addition of extra nucleotides or detectable labels to the disclosed nucleotide sequences (SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605) is

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[1] If the Examiner is arguing that no possession is shown because the precise claim language is not used in the specification, then she goes beyond what is required by the law. It is well-settled that the description of a claimed invention need not be *in ipsis verbis*. *Gentry Gallery v. Berkline Corp.*, 134 F.3d 1473, 1479, 45 U.S.P.Q.2d 1498, 1503 (Fed. Cir. 1998); *In re Alton*, 76 F.3d 1168, 1175, 37 U.S.P.Q.2d 1578, 1583 (Fed. Cir. 1996); *Martin v. Johnson*, 454 F.2d 746, 751, 172 U.S.P.Q. 391, 395 (C.C.P.A. 1972).

readily envisioned by one of ordinary skill in the art upon reading the present specification,[2] in particular at page 77 lines 1 *et seq.* (describing fusion peptide molecules encoded by the claimed nucleic acid molecules), page 58 lines 19 *et seq.* (describing sequences with labels to facilitate detection), page 103 lines 16 *et seq.* (describing site directed mutagenesis) and page 161 lines 22 *et seq.* (citing references describing the construction, manipulation and isolation of nucleic acid macromolecules). Additionally, the specification describes enzymes encoded by the nucleic acids of the present invention (specification at page 23, line 9 through page 31, line 4; at page 73, line 3 through page 75, line 2; and Table A) and vectors comprising the claimed nucleic acid molecules (specification at page 36, line 7 through page 40, line 6, and page 109, line 4 through page 118, line 9).

Moreover, the court determined, in *Enzo Biochecm, Inc. v. Gen-Probe Inc.*, 296 F.3d 1316, 1321, 63 U.S.P.Q.2d 1609, 1610 (Fed. Cir. 2002), that the written description inquiry is a factual one determined on a case-by-case basis and that, in a given disclosure, "it may well be that various subsequences, mutations, and mixtures of those sequences are also described to one of skill in the art." *Enzo*, 296 F.3d at 1326-1327, 63 U.S.P.Q.2d at 1615. Moreover, it is well established that claims "may be broader than the specific embodiment disclosed in a specification." *Ralston Purina Co. v. Far-mor-Co*, 772 F.2d 1570, 1575, 227 U.S.P.Q. 177, 179 (Fed. Cir. 1985) (*quoting In re Rasmussen*, 650 F.2d 1212, 1215, 211 U.S.P.Q. 323, 326 (C.C.P.A. 1981)).

(2) Applicants Have Described the Claimed Invention

The Final Action asserts that "[t]he disclosed subgenus and species embraced by the claims are not representative of the entire genus being claimed. The genius of nucleic acid

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[2] It is established patent jurisprudence that Applicants need not teach "conventional and well-known genetic engineering techniques." *E.g., Ajinomoto Co. v. Archer-Daniels-Midland Co.*, 228 F.3d 1338, 1345, 56 U.S.P.Q.2d 1332, 1337 (Fed. Cir. 2000).

molecules being claimed embraces any and every type of nucleic acid molecule that comprises any of SEQ ID Numbers 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605, and additional sequences of any size and sequence, not just vector backbones." According to the Examiner, Applicants have allegedly not adequately disclosed the claimed genus. The Examiner appears to assert that each nucleic acid molecule within the claimed genus must be described by its complete structure. These assertions are totally unfounded. The Federal Circuit has elucidated a test for written description wherein a genus of nucleic acids may be described by a structural feature that distinguishes members of the claimed genus from non-members of the claimed genus. *Regents of the University of California v. Eli Lilly and Co.*, 119 F.3d 1559, 1568-69, 43 U.S.P.Q.2d 1398, 1406 (Fed. Cir. 1997). Applicants have satisfied that test for written description.

The claimed nucleic acid molecules are a genera of nucleic acid molecules, each genus having a common structural feature of a particular enumerated nucleotide sequence, *i.e.*, SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605. The respective common structural feature (the nucleotide sequences of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605) is shared by every nucleic acid molecule in the claimed genera, and it distinguishes the members of the claimed genera from non-members. For example, if a nucleic acid molecule such as an mRNA contains the nucleotide sequence of SEQ ID NO: 586, then it is a member of the claimed genus of nucleic acid molecules comprising a nucleic acid sequence of SEQ ID NO: 586.[3] If a nucleic acid molecule does not contain SEQ ID NO: 586, then it is not a member of that claimed genus. The presence of other nucleotides at either end of the recited sequence will not interfere with the recognition of a claimed nucleic acid molecule as such – it either contains the nucleotides of SEQ ID NO: 586 or it does not. One skilled in the art, after reading the

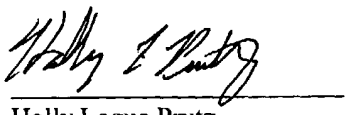
[3] The same argument applies with equal force to every genus of the claimed nucleic acid molecules. For example, if a nucleic acid molecule such as an mRNA contains the nucleotide sequence of SEQ ID NO: 590, then it is a member of the claimed genus of nucleic acid molecules comprising a nucleic acid sequence of SEQ ID NO: 590, and so forth.

present specification, would clearly know if a nucleic acid molecule contains one of the recited nucleotide sequences. Thus, claims 1 and 10-22 are supported by an adequate written description pursuant to the requirements of 35 U.S.C. § 112, and the rejection should be reversed.

CONCLUSION

In view of the foregoing, it is respectfully requested that the Board of Patent Appeals and Interferences reverse the Rejections and that the subject application be allowed forthwith.

Respectfully submitted,



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APPENDIX A

1. A substantially purified nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, 605 and complements thereof.

10. The substantially purified nucleic acid molecule according to claim 1, wherein said nucleic acid molecule comprises a nucleic acid sequence having between 100% and 90% identity with a sequence selected from the group consisting of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, 605, and complements thereof.

11. A substantially purified nucleic acid molecule, comprising a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604 and 605.

12. The nucleic acid molecule of claim 11, wherein said sequence is SEQ ID NO: 586.

13. The nucleic acid molecule of claim 11, wherein said sequence is SEQ ID NO: 590.

14. The nucleic acid molecule of claim 11, wherein said sequence is SEQ ID NO: 594.

15. The nucleic acid molecule of claim 11, wherein said sequence is SEQ ID NO: 596.

16. The nucleic acid molecule of claim 11, wherein said sequence is SEQ ID NO: 597.

17. The nucleic acid molecule of claim 11, wherein said sequence is SEQ ID NO: 599.

18. The nucleic acid molecule of claim 11, wherein said sequence is SEQ ID NO: 600.

19. The nucleic acid molecule of claim 11, wherein said sequence is SEQ ID NO: 601.

20. The nucleic acid molecule of claim 11, wherein said sequence is SEQ ID NO: 604.

21. The nucleic acid molecule of claim 11, wherein said sequence is SEQ ID NO: 605.

22. A substantially purified nucleic acid molecule according to claim 10, wherein said nucleic acid molecule comprises a nucleic acid sequence having between 100% and 95% identity with a sequence selected from the group consisting of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, 605, and complements thereof.

23. A substantially purified nucleic acid molecule consisting of a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 586, 590, 594, 596, 597, 599, 600, 601, 604, and 605.